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Warsaw, Kosciusko County, C. C. Deam, no. 55,328; north end of Clark St., Gary (formerly Pine), Lake County, C. C. Deam, no. 55,529; low marl border of east side of Adams Lake, 3 miles northeast of Wolcotville, Lagrange County, August 16, 1934, C. C. Deam, no. 55,357A. MICHIGAN: open, sandy shore of pond east of Silver Lake, 6¹/₂ miles northwest of Dexter, Washtenaw County, August 31, 1934, F. J. Hermann, no. 6430 (Gray Herbarium, Brooklyn Botanic Garden), and November 26, 1934, no. 6457.-F. J. HERMANN, University of Michigan.

ACORUS CALAMUS IN AMERICA

MURRAY F. BUELL

ACORUS CALAMUS L. in its several varieties grows without cultivation over a large part of the north temperate zone and the adjacent tropics. In eastern Asia, where Engler¹ recognizes four varieties, it occurs in one form or another from Ceylon to the Amur River, and inland as far as Lake Baikal. In Europe it occurs from the Alps northward to Scandinavia and Russia, and in a few places in the Mediterranean region. In North America it is widely distributed east of the Rocky Mountains from the Gulf of St. Lawrence to Florida, and westward to Texas, Montana, and as far north as the Peace River. In both Europe and North America the plant seems to belong uniformly to Linnaeus' var. vulgaris.

No one seems ever to have questioned that the species in some form is indigenous in Asia. The presence of several varieties not known elsewhere, and the occurrence of a second species (A. gramineus) with a substantially similar range, seem to indicate its native status beyond a shadow of doubt.

In Europe, although the plant is said to be uniformly sterile, botanists did not seriously question its indigenous status until the second half of the nineteenth century, but by the beginning of the present century European botanists seem to have been pretty well agreed that it is an introduced plant which has become naturalized since the middle of the sixteenth century, and the researches of Mücke fully confirm this.²

As to its status in North America various opinions are expressed by

¹ ENGLER, Das Pflanzenreich, IV, 23 B. 308. (1905).

² See ENGLER, I. C.; ASCHERSON AND GRAEBNER, Synopsis, II, 2. 365 (1904). Mücke, M., Über den Bau und die Entwicklung der Früchte und über die Herkünft von Acorus calamus L. Bot. Zeit. LXVI, 1-23. (1908). According to the latter author the immediate source of the plant was from living rhizomes sent from Constantinople to Matthiolus in Prague in 1557, and to Clusius in Vienna in 1574. What was the ultimate source of this material remains to be determined.

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different authors: Asa Gray¹ says of it: "Probably truly indigenous northward." Dame and Collins² believe it to be native in Massachusetts. On the other hand, Chapman³ states that in the southern United States it is "apparently introduced." As to its condition in the interior of the continent, Melvin Gilmore⁴ believes that it was brought by the Indians from the Atlantic coast and that elsewhere it occurs only near the sites of old Indian camping grounds. In his discussion he makes the statement, "Calamus is a plant which very seldom blooms and I have never known it to produce seeds, so that it is not adapted to disseminate itself or invade new territory." This is certainly not a correct statement of the situation in Minnesota, nor apparently in other parts of the interior of North America. I have found it producing good fruit at widely scattered locations in Minnesota: in the east central part of the state at Savage in Scott County and also along the Mississippi River at St. Paul; two hundred miles to the northwest at the headwaters of the Mississippi; even farther to the northeast near Ely, St. Louis County, where the plant was thriving in a backwater of Stony River, and again on the sandy shore of Burntside Lake. Furthermore, University of Minnesota herbarium specimens show well developed fruiting spikes from all parts of Minnesota, and the same is true of specimens from Illinois and Indiana, and as far east as northern New York. Through correspondence with botanists in various parts of the country I have learned that this range of good fruiting material may be extended as far south as Kansas and Missouri. The places where the plant fails to produce fruit here are those locations where it is shaded for a good part of the day or where the ground dries out during early or mid-summer. Calamus seems to thrive only where the rhizome is continuously submerged, at least until late summer, and where it receives the maximum sunlight. Soil type has considerable effect on its luxuriance. Where plants are growing in sand, vegetative growth is less; where they are rooted in rich humus or muck, the rhizomes and leaves are conspicuously larger, but in either case it fruits freely. The seeds produced are viable and germinate readily the following spring. How frequently they germinate in nature in Minnesota is not known, but in at least

¹ GRAY, Manual. ed. 5. 478. (1868).

² DAME, L. L. and F. S. COLLINS, Flora of Middlesex. 98. (1888).

³ CHAPMAN, Flora. ed. 3. 466. (1897).

⁴ GILMORE, MELVIN R. Dispersal by Indians a factor in the extension of discontinuous distribution of certain species of native plants. Papers Mich. Acad. Sci. Arts and Letters. XIII, 89–94. (1931).

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one case I have found abundant vigorous seedlings. This was in late June, 1933, on the shores of Burntside Lake near Ely, in one of the coldest parts of the state.

There seems no valid reason to doubt that Acorus Calumus is native to North America. There are in the Gray Herbarium a few fruiting specimens from New England,¹ and the facts seem to indicate very definitely that the plant is wholly native in the interior. Here in Minnesota the plant is common throughout the state and bears fruit freely. There is nothing about the local distribution to suggest an introduced plant. Its general distribution is very much like that of Symplocarpus foetidus and the genus Arisaema of the Araceae, as well as many other genera and even species of other families, i. e., it occurs in Asia and eastern North America.² This distribution is known in many cases to be a direct result of the Pleistocene disruption of an earlier and much wider circumboreal range. One does not question that Symplocarpus has lived in our swamps or Arisaema in our woods for ages past. It seems no more than reasonable to assume that these hardy aroids of similar distribution have had the same paleontological history, though the records in the case of Acorus have become much blurred by human interference.

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HITCHCOCK'S MANUAL OF THE GRASSES.—For several years botanists of the United States have been looking forward to the appearance of Hitchcock's illustrated volume on the grasses. Now, in May, the first copies have become generally available, although the title-page says

¹ It has been suggested that the sterile European race may have been introduced into certain parts of North America. Without doubt the early settlers along the Atlantic coast were familiar with the domestic uses of the plant. In fact even to-day the rhizomes are used somewhat by their descendants in making candy, and in rural New England one occasionally finds "candied sweet flag" for sale. These settlers possibly brought rhizomes of Acorus with them, and it seems possible that some of the material now growing wild in the older settled areas is actually from this source. In this connection see GRAVES, C. B., et al, Catalogue of the flowering plants and ferns of Connecticut. 111. (1910).

² Its actual status seems to be intermediate between the two genera cited. Symplocarpus, a monotypic genus, occurs in apparently identical form in eastern North America and temperate East Asia. Arisaema with two or three species in eastern North America extending into South America has several closely related though obviously distinct species in temperate eastern Asia, as well as a large number of species in the tropics of the Old World. Acorus Calamus occurs as var. vulgaris in the eastern half of North America, and at least in large part as distinct varieties in eastern and southeastern Asia, while there is a second Asiatic species. Engler, indeed, cites several east Asiatic localities for var. vulgaris. Not having seen any Asiatic specimens, I am unable to judge whether these are identical with our North American material. If they are, the natural distribution of this variety would be very like that of the skunk cabbage cited above.